March 28, 1939. L. E. TRINKLE 2,151,723

TOOTH RESTORATION AND ANCHORAGE AND PROCESS OF FORMING SAME

Filed Sept. 19, 1935

FIG. 1

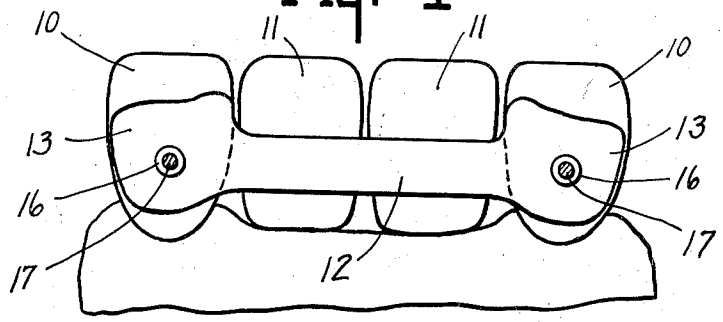


FIG. 2

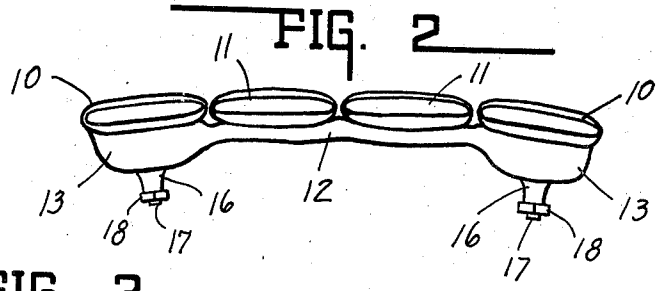


FIG. 3

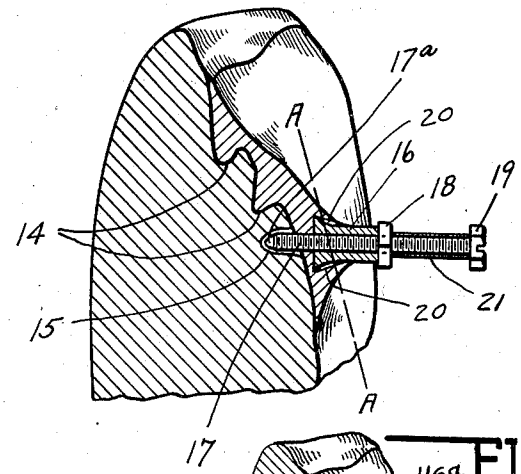


FIG. 4

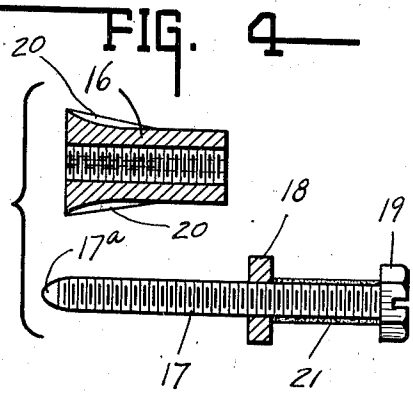
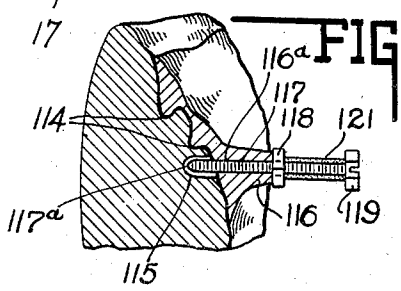


FIG. 5



INVENTOR.
LEONARD E. TRINKLE.
BY Lockwood Goldsmith & Galt
ATTORNEYS.

Patented Mar. 28, 1939 2,151,723

UNITED STATES PATENT OFFICE

2,151,723

TOOTH RESTORATION AND ANCHORAGE AND PROCESS OF FORMING SAME

Leonard E. Trinkle, Terre Haute, Ind.

Application September 19, 1935, Serial No. 41,275

6 Claims. (Cl. 32—15)

This invention relates to the art of dental surgery and particularly to artificial restorations and more specifically to the method of anchoring the same to a natural tooth, or teeth, and the appliances and fixtures therefor.

The object of the invention is to simplify the method of applying restorations to the patient in such a manner as to reduce the time required in such work and to cause the minimum amount of work on the natural tooth, or teeth, employed to support the restoration.

Thus, the method hereinafter described provides for the retention of a restoration to one or more natural teeth. It eliminates or minimizes tooth destruction in the preparation for restoration, conserves the translucency of the tooth by elminating practically all gold or metal from the incisal third of the tooth; thus, allowing light to pass through that thin part of the tooth, which, if backed by opaque material, will cause the tooth to be opaque, thereby giving the tooth a darker color than an adjoining tooth, or teeth, and provides a key or lock for the restoration, such as crowns, inlays, castings, et cetera.

The principal feature of the invention resides in the method of retention of restorations, such as above referred to, through the medium of an inter-locking casting held in place by a screw threaded set screw, reenforced by a cement coating, as distinguished from the usual methods of gripping the tooth under pressure, the employment of inlaid pins, cement, or the like.

Another feature of the invention resides in the employment of means for supporting the set screw in place, such as a threaded sleeve rigid with the casting, whereby the screw may be readily manipulated while held in place, thereby before the cement, in which it is to be imbedded, sets, thus greatly simplifying the mechanics required in setting and locking the restoration in place.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:

In the drawing, Fig. 1 is a rear elevation illustrating the application of a restoration in bridge form.

Fig. 2 is a plan view thereof.

Fig. 3 is an enlarged perspective view showing the application of a single tooth restoration, the locking screw and supporting sleeve being shown in cross section.

Fig. 4 is an enlarged view of the sleeve in cross section and an elevation of the locking screw.

Fig. 5 is a view similar to Fig. 3 of a modified form of the invention.

In Figs. 1 and 2 of the drawing, there is illustrated a pair of spaced natural teeth **10**, a pair of artificial teeth **11** therebetween and supported upon the metal bridge **12**. Each end of the bridge is provided with a natural tooth anchorage, such as a casting **13**, applied to and interlocked with the natural tooth. In fitting and applying casting **13**, the natural tooth is ground to provide one or more grooves or recesses **14** in the back surface thereof, as well as at least one shallow hole or recess **15**, see Fig. 3.

This assumes that no restoration is required for the natural tooth. If a restoration of lost tooth structure is required, the proper preliminary reduction of the natural tooth must be made and then the recesses and hole are cut. It is to be understood that basically this invention relates to natural tooth restoration anchorage and consequently bridge anchorage and the like, is ancillary.

The usual impression is made of the rear surface of the natural tooth, as thus prepared, and from it the restoration casting **13** is made. After the restoration casting is formed, the threaded sleeve **16** is soldered or welded thereto and the casting, if it is to constitute a bridge anchorage, is soldered or welded to the bridge or structure **12**. The sleeve may be cast in the restoration, if desired. A screw **17** having a threaded lock nut **18** thereon, is threaded into place in the sleeve **16** which is mounted upon the casting. Thus, the screw **17** is held in place by the sleeve, ready for manipulation.

Lock nut **18** is accurately positioned on screw **17** against the exposed end of sleeve **16** after the head **19** has been turned to inwardly seat the end **17***a* of the screw in the hole **15**, such that the restoration is not wedged away from natural seating in or upon the tooth. Cement, as indicated at **21** or its equivalent, on screw **17** between lock nut **18** and head **19**, keeps lock nut **18** securely fixed on the screw as a stop or guide to determine the end of the screw **17***a* is properly seated in hole **15** when the fixture is permanently set or placed. Thereafter, the screw is unthreaded at least until the head **17***a* does not project beyond the natural tooth engaging surface of the restoration.

When cast therein, the sleeve has external interlocking means thereon such as a rib, ribs, grooves or roughened surfaces, **20** to prevent sleeve rotation in the casting when the screw is threaded inwardly and engages the wall of recess **15**. The sleeve provides an elongated bearing for the screw.

The casting, however, may have a boss formed integral therewith which is then drilled and tapped as shown in Fig. 5 which is the equivalent of the sleeve construction. Similar numerals of the one hundred series indicate similar or like parts.

It is to be understood that recess **15** is formed in the natural tooth after the casting is made and its position is located by marking the same on the natural tooth by a marking device applied through the sleeve or like opening in the casting. The hole in the tooth may be made before the impression is taken, if the impression material is a hydro-celloid material. The hole then will be recorded in the model. The tube is placed in relation to said recorded hole in the model and the waxed pattern attached thereto. When soldering the sleeve to the casting, is the type of connection used therebetween, the tube is placed in a small hole in the waxed pattern opposite the hole in the model.

The casting is then removed from the tooth following the marking, then the recess **15** is formed and then the screw adjusted therein, as noted. Then the casting is removed from the tooth and the usual dental cement is applied to the prepared surface of the natural tooth and to the recesses **14** and **15**, as well as the interior of the screw sleeve **16** by removing, backing out to a substantial degree, the screw **17**. Nut **18** determines the final position of screw **17** for restoration locking and as will be obvious, will prevent wedging separation between the tooth and restoration. The restoration is then mounted in position with the casting, or castings, and fitted over the natural tooth, or teeth, so as to interlock with the cemented undercut recesses **14**. In this position, a suitable tool is applied to the head **19** of the screw **17**, so that the latter is then screwed into the sleeve until the end **17***a* of the screw is imbedded and locked in the recess **15** and entirely surrounded by the cement. Nut **18**, as stated, determines this positioning by lock nut **18** engaging the end of sleeve **16** or its equivalent. This positioning of the restoration and screw anchorage is accomplished before the cement has become set or hardened and by reason of the fact that the screw is held ready for tightening which immediately after mounting may be quickly accomplished.

The lock nut **18**, if desired, may, after being initially positioned, be backed off a slight amount so as to permit the screw **17** with its end **17***a* to obtain the maximum nesting of the latter in hole **15** and then the lock nut **18** when returned to its original determined position, will hold the screw in the sleeve while the cement thoroughly sets. Thereafter, the screw and sleeve are cut off of the casting, as indicated by the line *a*—*a* in Fig. 3, so as to leave no objectionable projection after the restoration has been permanently anchored, and then the restoration surface is finished as desired.

While the invention has been illustrated herein as applied to but one type of bridge work and a single tooth restoration, it will be understood that the same method and mediums employed therein are applicable to crowns, inlays and like restorations for the retention on the natural tooth of the metal castings employed therein.

Herein the term "casting" includes the more technical terms "castings", "swedgings" and "contourings".

This invention claimed is:

1. In the art of dentistry, the method of anchoring a restoration on a permanent tooth, consisting in providing a restoration locking groove in the surface of the permanent tooth to form a restoration anchorage, forming a restoration casting of suitable metal adapted to snugly fit the prepared surface of the tooth, providing a threaded hole in the casting, forming a registering hole in the surface of the permanent tooth in juxtaposition to the recessing, mounting a lock screw in the casting and temporarily locking the casting to the tooth by means of the screw, adjusting a lock nut on the screw to determine the ultimate locking position thereon, backing out the screw to remove the casting, placing cement in the groove and the hole of the permanent tooth, applying the casting to the cemented tooth, screwing the screw into the tooth hole the full limit of travel as determined by the adjusted lock nut and before the cement becomes set, and then cutting off the exposed end of the screw to conform to the exposed surface of the casting.

2. A method as defined by claim 1, characterized by the additional step of backing off of the lock nut prior to the cutting off of the exposed end of the screw.

3. In the art of dentistry, the method as defined by claim 1, characterized by the forming of the threaded opening in the casting by the original inclusion of a threaded sleeve projecting beyond the surface of the casting.

4. In the art of dentistry, the method as defined by claim 1, characterized by the forming of the threaded opening in the casting by the original inclusion of a threaded sleeve projecting beyond the surface of the casting, and by the step of backing off of the lock nut prior to the cutting off of the exposed end of the screw.

5. In the art of dentistry, a restoration comprising a casting provided with a screw threaded hole therein, said casting being formed to snugly fit a permanent tooth having a prepared surface, a locking groove and a recess formed therein, said casting having a tongue to fit in the tooth groove, a set screw mounted in the threaded hole and adapted for initial positioning in the natural tooth recess with which the hole registers when the casting is positioned upon the tooth, and a lock nut on said set screw for determining the locking position of the set screw for permanent mounting of the casting said lock nut preventing undesirable wedging occurring between the tooth and casting in the final mounting of the set screw.

6. In a dental anchor for application to a prepared surface of a permanent tooth having a locking groove and a recess, a casting having an opening therethrough to register with said recess, a projection on the inner face of said casting to interlock with said groove, an internally threaded sleeve secured to said casting and alined with said opening, means to rigidly hold said sleeve to said casting, a set screw threaded in said sleeve and adapted to project into said recess, and a lock nut on said screw to engage with said sleeve to determine the degree said screw will project into said recess.

LEONARD E. TRINKLE.